

Claims

What is claimed is:

[c1] A drill bit comprising:

a bit body;

at least one roller cone rotatably mounted on said bit body; and

a plurality of milled teeth at selected locations on the cone, wherein at least one of said milled teeth comprises a substrate having a convex crest and a layer of hardfacing applied to said convex crest, wherein said convex crest is adapted to produce at least one of a convex axial stress distribution, a substantially even axial stress distribution, and a substantially smooth axial stress distribution.

[c2] The drill bit body of claim 1 wherein a crest of the layer of hardfacing is substantially flat.

[c3] The drill bit body of claim 1 wherein a crest of the layer of hardfacing is convex.

[c4] The drill bit body of claim 3 wherein the thickness of the layer of hardfacing greater at least one corner than in a middle of the crest.

[c5] The drill bit body of claim 4 wherein an axial stress distribution of the crest is convex.

[c6] The drill bit body of claim 4 wherein an axial stress distribution of the crest is substantially level.

[c7] The drill bit body of claim 1 wherein an axial stress distribution of the crest is convex.

- [c8] The drill bit body of claim 1 wherein an axial stress distribution of the crest is substantially level.
- [c9] The drill bit body of claim 1 wherein at least one of said teeth has a flank, wherein said flank is convex.
- [c10] The drill bit body of claim 9 wherein at least one of said teeth has an end, wherein said end is convex.
- [c11] The drill bit body of claim 9 wherein at least one of said teeth has an end, wherein said end is concave.
- [c12] The drill bit body of claim 1 wherein at least one of said teeth has a flank, wherein said flank is concave.
- [c13] The drill bit body of claim 12 wherein at least one of said teeth has an end, wherein said end is convex.
- [c14] The drill bit body of claim 12 wherein at least one of said teeth has an end, wherein said end is concave.
- [c15] The drill bit body of claim 1 wherein at least one of said teeth has an end, wherein said end is convex.
- [c16] The drill bit body of claim 1 wherein at least one of said teeth has an end, wherein said end is concave.
- [c17] The drill bit body of claim 1 wherein said convex crest is substantially aligned with an axis of rotation of said roller cone.
- [c18] The drill bit body of claim 1 wherein said convex crest is substantially aligned with a line that is within about 40° of an axis of rotation of said roller cone.

[c19] The drill bit body of claim 1 wherein said convex crest is substantially aligned with a line that is within about 30° of an axis of rotation of said roller cone.

[c20] The drill bit body of claim 1 wherein said convex crest is substantially aligned with a line that is within about 15° of an axis of rotation of said roller cone.

[c21] A method of forming milled teeth on a roller cone of a milled tooth roller cone rock bit comprising:

shaping a crest of at least one chisel shaped milled tooth, so that said crest comprises at least one convex profile from one corner to an opposite corner of said crest, wherein said convex crest is adapted to produce at least one of a convex axial stress distribution, a substantially even axial stress distribution, and a substantially smooth axial stress distribution; and

radiusing each of said corners at the ends of the crest of said chisel shaped tooth.

[c22] The method as set forth in claim 21 further comprising:

applying hardfacing material over said at least one chisel shaped mill tooth, said hardfacing material is applied over said radiused corners.

[c23] The method as set forth in claim 21 wherein there is a single convex profile formed between said radiused ends of said crest of said milled teeth.